WKS 6-7 – Chem H
Electron configurations of Ions

Name Answer Key
Period _____ Date _____

1) A particular neutral atom has the following ground state electron configuration, $[Ar]4s^2$.
   a) What element has this electron configuration? Ca
   b) What group is this element in? alkaline earth metals (2/IIA)
   c) How many valence electrons does this atom have? 2
   d) Would this element **lose or gain** electrons when it reacted with another element and formed an ion? *(This ion is part of a newly formed stable ionic compound.)* lose
   e) Write the **electron configuration** for the ion that is formed. [Ar]
   f) Write the **symbol** (with charge) of this ion. Ca^{2+}
   g) Is this ion **larger or smaller** than the neutral atom of this element? smaller

2) A particular neutral atom has the following ground state electron configuration, $[Ar]4s^23d^{10}4p^5$.
   a) What element has this electron configuration? Br
   b) What group is this element in? halogens (17/VIIA)
   c) How many valence electrons does this atom have? 7
   d) Would this element **lose or gain** electrons when it reacted with another element and formed an ion? *(This ion is part of a newly formed stable ionic compound.)* gain
   e) Write the **electron configuration** for the ion that is formed. $[Ar]4s^23d^{10}4p^6$
   f) Write the **symbol** (with charge) of this ion. Br^-
   g) Is this ion **larger or smaller** than the neutral atom of this element? larger

3) A particular neutral atom has the following ground state electron configuration, $[Ne]3s^23p^1$.
   a) What element has this electron configuration? Al
   b) What group is this element in? 13 (IIIA)
   c) How many valence electrons does this atom have? 3
   d) How many electrons are in this atom's second main energy level (n=2)? 8
   e) Would this element **lose or gain** electrons when it reacted with another element and formed an ion? *(This ion is part of a newly formed stable ionic compound.)* lose
   f) Write the **electron configuration** for the ion that is formed. [Ne]
   g) Write the **symbol** (with charge) of this ion. Al^{3+}
   h) Is this ion **larger or smaller** than the neutral atom of this element? smaller

4) A particular neutral atom has the following ground state electron configuration, $[Ne]3s^23p^4$.
   a) What element has this electron configuration? S
   b) How many protons are in the nucleus of this atom? 16
   c) What group is this element in? 16 (VIA)
   d) How many valence electrons does this atom have? 6
   e) How many unpaired electrons does this atom have? 2
   f) Would this element **lose or gain** electrons when it reacted with another element and formed an ion? *(This ion is part of a newly formed stable ionic compound.)* gain
   g) Write the **electron configuration** for the ion that is formed. $[Ne]3s^23p^6$
   h) Write the **symbol** (with charge) of this ion. S^{2-}
   i) Is this ion **larger or smaller** than the neutral atom of this element? larger

[over]

5) A particular neutral atom has the following ground state electron configuration, $[Ar]4s^23d^2$.

a) What element has this electron configuration? Ti

b) How many protons are in the nucleus of this atom? 22

c) What group is this element in? transition metals (4/IVB)

d) Which electrons would be lost first in the formation of an ion? $4s^2$

e) Write the **electron configuration** for the ion that is formed when this atom loses these electrons. $[Ar]3d^2$

f) Write the **symbol** (with charge) of this ion. Ti^{2+}

g) Write the **electron configuration** for the ion that is formed when this atom loses all of its outer electrons. [Ar]

h) Write the **symbol** (with charge) of this ion. Ti^{4+}

6) A particular neutral atom has the following ground state electron configuration, $[Kr]5s^24d^7$.

a) What element has this electron configuration? Rh

b) What group is this element in? Transition Metals (9/VIIIB)

c) How many protons are in the nucleus of this atom? 45

d) Which electrons would be lost first in the formation of an ion? $5s^2$

e) Write the **electron configuration** for the ion that is formed when this atom loses these electrons. $[Kr]4d^7$

f) Write the **symbol** (with charge) of this ion. Rh^{2+}

g) How many unpaired electrons does this ion contain? 3

h) Write the **electron configuration** for the ion that is formed when this atom forms a 4+ ion. $[Kr]4d^5$

i) Write the **symbol** (with charge) of this ion. Rh^{4+}

j) How many unpaired electrons does this ion contain? 5